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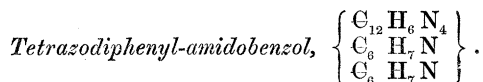
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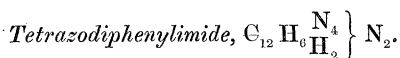
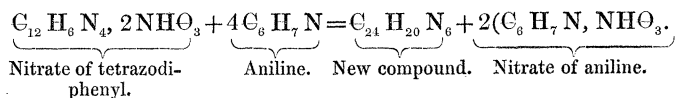
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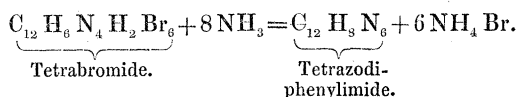
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This complex body is formed when an aqueous solution of nitrate of tetrazodiphenyl is mixed with aniline. It is deposited in a yellow crystalline mass, which can be recrystallized from alcohol or ether (in which it is but slightly soluble), and is obtained in lancet-like plates. When heated in a dry state, it is decomposed with slight explosion. Its formation is expressed by the equation



This body is obtained in the form of slightly yellowish-tinged lustrous plates, which are very difficultly soluble in cold, readily, however, in hot alcohol and in ether. It combines neither with acids nor with bases. Heated by itself it explodes. The following equation explains its formation :—



I have not succeeded in preparing tetrazodiphenyl in a free state, nor have I been able to obtain compounds of tetrazodiphenyl with bases in anything like a well-characterized condition. I pass over the abortive experiments made by me in this direction.

Many of the experiments just described have been carried on in the laboratory of the Royal College of Chemistry, London, others in that of the University of Marburg; and I take this opportunity of returning my thanks to Prof. Hofmann of London, and Prof. Kolbe of Marburg, for allowing me the use of these institutions.

XXI. "New Observations upon the Minute Anatomy of the Papillæ of the Frog's Tongue." By LIONEL S. BEALE, M.B., F.R.S., F.R.C.P., Professor of Physiology and of General and Morbid Anatomy in King's College, London; Physician to the Hospital, &c. Received June 16, 1864.

(Abstract.)

After alluding to the observations of Axel Key, whose results accord with his own more closely than those of any other observer, the author refers particularly to the drawings of Hartmann, the latest writer upon the structure of the papillæ. According to the author, Dr. Hartmann, owing

to the defective method of preparation he employed, has failed to observe points which had been seen by others who had written before him, and which may now be most positively demonstrated. Hartmann's process consisted in soaking the tissue for three days in solution of bichromate of potash, and afterwards adding solution of caustic soda. It can be shown by experiment that many structures which can be most clearly demonstrated by other modes of investigation, are rendered quite invisible by this process. Hartmann's observations, like those of the author, have been made upon the papillæ of the tongue of the little green tree-frog (*Hyla arborea*).

With reference to the termination of the nerves in the fungiform papillæ of the tongue of the *Hyla*, the author describes a plexus of very fine nerve-fibres, with nuclei, which has not been demonstrated before. Fibres resulting from the division of the dark-bordered fibres in the axis of the papilla can be traced directly into this plexus. From its upper part fine fibres, which interlace with one another in the most intricate manner, forming a layer which appears perfectly granular, except under a power of 1000 or higher, may be traced into the hemispheroidal mass of epithelium-like cells which surmounts the summit of the papilla. This hemispheroidal mass belongs not to epithelial, but to the nervous tissues. It adheres to the papilla after every epithelial cell has been removed; the so-called cells of which the entire mass consists cannot be separated from one another like epithelial cells; fibres exactly resembling nerve-fibres can often be seen between them; and very fine nerve-fibres may be traced into the mass from the bundle of nerves in the papilla.

The fine nerve-fibres which are distributed to the simple papillæ of the tongue, around the capillary vessels, and to the muscular fibres of these fungiform papillæ, come off *from the very same trunk as that from which the bundle of purely sensitive fibres which terminate in the papillæ are derived*. The fine nucleated nerve-fibres of the capillaries which the author has demonstrated have been traced into undoubted nerve-trunks in many instances, so that it is quite certain that many of the nuclei which have been considered to belong to the connective tissue (connective-tissue corpuscles) are really the nuclei of fine nerve-fibres not to be demonstrated by the processes of investigation usually followed\*. These nerve-fibres in the connective tissue around the capillaries are considered by the author to be the afferent fibres of the nerve-centres of which the efferent branches are those distributed to the muscular coat of the small arteries.

The author's observations upon the tissues of the frog convince him that the nervous tissue is distinct in every part of the body from other special tissues. For example, he holds that nerve-fibres never pass by continuity of tissue into the 'nuclei' (germinal matter) of muscular fibres, or into those

\* See "On the Structure and Formation of the so-called Apolar, Unipolar, and Bipolar Nerve-cells of the Frog," Phil. Trans. 1863, plate 40. fig. 44.

of tendon, of the cornea, or of epithelium. He advances arguments to show that the epithelium-like tissue upon the summit of the papilla is not epithelium at all, but belongs to the nervous tissues. Hence it follows that nerves do not influence any tissues by reason of continuity of tissue, but solely by the nerve-currents which pass along them\*.

The author states that the so-called 'nuclei' (germinal matter) of the fine muscular fibres of the papillæ are continuous with the contractile material, as may be demonstrated by a magnifying power of 1800 linear; and he holds the opinion that the contractile matter is formed from the nuclei. He adduces observations which lead him to the conclusion that these nuclei alter their position during life, and that, as they move in one or other direction, a narrow line of new muscular tissue (fibrilla) is as it were left behind†. This is added to the muscular tissue already formed, and thus the muscle increases.

XXII. "Indications of the Paths taken by the Nerve-currents as they traverse the caudate Nerve-cells of the Spinal Cord and Encephalon." By LIONEL S. BEALE, M.B., F.R.S., F.R.C.P., Professor of Physiology and of General and Morbid Anatomy in King's College, London; Physician to the Hospital, &c. Received May 18, 1864.

Although the caudate nerve-vesicles, or cells existing in the spinal cord, medulla oblongata, and in many parts of the brain, have been described by the most distinguished modern anatomists, there yet remains much to be ascertained with reference to their internal structure, connexions, and

\* The author feels sure that the conclusions of Kühne, who maintains that the axis cylinder of a nerve-fibre is actually continuous with the 'protoplasm' (germinal matter) of the corneal corpuscle, result from errors of observation. The prolongations of the corneal corpuscles, on the contrary, pass over or under the finest nerve-fibres, but are *never* continuous with them, as may be distinctly proved by examining properly prepared specimens under very high magnifying powers (1000 to 5000 linear). The corneal tissue results from changes occurring in one kind of germinal matter—the nerve-fibres distributed to the corneal tissue from changes occurring in another kind of germinal matter. If the connexion is as Kühne has described, a 'nucleus' or mass of germinal matter would be producing nervous tissue in one part and corneal tissue in another part; and since it has been shown that the 'nuclei' of the corneal tissue are continuous with the corneal tissue itself, the nerve-fibres must be continuous, through the nuclei, with the corneal tissue itself; and if with corneal tissue, probably with every other tissue of the body. But such a view is opposed to many broad facts, and not supported by minute observation. The nuclei of the nerve-fibres are one thing, the nuclei of the corneal tissues another; and the tissues resulting from these nuclei, nerve-tissue, and corneal tissue are distinct in chemical composition, microscopical characters, and properties and actions.

† "New Observations upon the Movements of the Living or Germinal Matter of the Tissues of Man and the higher Animals," Archives, No. XIV. p. 150.